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Phantom flight

Boeing UAS makes first flight at Dryden

The successful first flight of The Boeing Co.'s Phantom Ray, a jet-powered, fighter-size unmanned aircraft system, was completed April 27 at Dryden.

The center is hosting Phantom Ray flight test operations and providing hangar facilities, engineering and ground test support. Flight test range support for the project is also being provided under a Boeing-funded commercial Space Act agreement with NASA.

The 17-minute flight followed a series of high-speed taxi tests in March that validated ground guidance and navigation and control systems and verified mission planning, pilot interface and operational procedures. The craft flew to 7,500 feet and reached a speed of 178 knots.

The flight demonstrated the Phantom Ray's basic airworthiness, setting the stage for additional flights in the next few weeks. The upcoming Boeing-funded flights will prepare the aircraft to support potential missions that may include intelligence, surveillance and reconnaissance; suppression of enemy air defenses; electronic attack; strike; and autonomous air refueling.

"The first flight moves us farther into the next phase of unmanned aircraft," said Craig Brown, Boeing's

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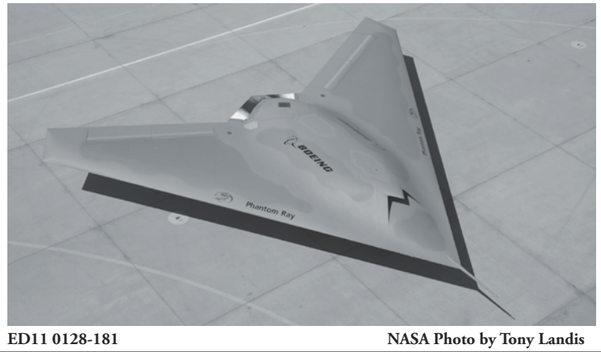
ED11 0128-106 NASA Photo by Tom Tschida



ED11 0128-181 NASA Photo by Tony Landis

***Above**, the Boeing Phantom Ray takes to the sky for a first flight April 27. During the flight test, the jet-powered, fighter-size unmanned aircraft system flew to 7,500 feet at a speed of 178 knots.*

***At left** is a different view of the Phantom Ray. Dryden also is hosting Boeing's Phantom Eye test flights.*

Lee Scherer, former center director, dies

Lee R. Scherer, who served as the third director of the NASA Flight Research Center – now Dryden – from 1971 to 1975, died May 7 in San Diego. He was 92.

Lee Scherer

Scherer was appointed director of the Flight Research Center on Oct. 11, 1971. During his tenure, he continued most of the programs established by his predecessor, Paul Bikle, while aligning the center's interests and projects with those of NASA Headquarters.

On Jan. 19, 1975, after leading the Flight Research Center for three years, Scherer was appointed director of Kennedy Space Center, where he oversaw the 1975 Apollo-Soyuz test project – a joint manned space venture with the Soviet Union – and also the early buildup for the space shuttle program.

Scherer was promoted on Sept. 2, 1979, to associate administrator for external relations at NASA Headquarters, a position he held until his retirement from the agency.

Scherer first came to NASA in 1962 while still on active duty as a captain in the U.S. Navy. Prior to his tenure at the Flight Research Center, he served in the Office of Space Science and Applications at NASA Headquarters as assistant director of lunar programs and manager of the lunar orbiter program from its inception in 1963 through its completion in 1967. From 1967 to 1971, Scherer was director of the Apollo Lunar Exploration Office, responsible for scientific aspects of lunar exploration.

Scherer was a 1942 honors graduate from the U.S. Naval Academy. Most of his 25-year naval career was spent in aviation, including one tour flying carrier-based fighters and flight-test experience with helicopters.

He received a second Bachelor of Science degree in aeronautical engineering in 1949 from the U.S. Naval Postgraduate School and a master's degree in aeronautical engineering from the California Institute of Technology in 1950.

Awards he received include NASA's Exceptional Service Medal in 1967, NASA's Exceptional Scientific Achievement Medal in 1969 and the NASA Distinguished Service Medal in 1974.

Following retirement from NASA, Scherer served as a senior executive with General Dynamics Commercial Services Group in San Diego.

Seven receive SFA awards

Seven Dryden employees received Space Flight Awareness awards April 27 in a ceremony in Orlando, Fla.

Honorees were Richard D. Batchelor, Richard W. Dykstra, Judy Grizzard, David A. Jones, Lori Losey, James Pavlicek and Michael G. Webb. Jones and Pavlicek are NASA employees. Batchelor, Dykstra, Losey and Webb are employed by Arcata Assoc., Grizzard by Kay & Assoc.

STS-133 astronaut Michael Barratt presented the awards.

NASA Photo

From left, Richard Dykstra, Judy Grizzard, Lori Losey and Richard Batchelor are pictured after receiving Space Flight Awareness awards from astronaut Mike Barratt, right.

Batchelor, a field service engineer, was honored for his work with the ground VHF system that provides a voice communications link between NASA and the International Space Station. First developed for use with the Russian Mir space station, the system has been upgraded over the years and is in use today providing emergency communcations for the ISS and Soyuz programs.

A member of the Aeronautical Tracking Facility team, Dykstra, also a field service engineer, has supported more than 125 shuttle missions in his work with radar systems during launch, on-orbit and landing operations. He also supports aeronautical research projects.

Project manager Judy Grizzard is the shuttle technical liaison for shuttle missions and also supervises Aircraft Ground Equipment maintenance operations and shop staff. She has supported every shuttle mission since STS-26.

Losey is a senior producer/director and video supervisor for Dryden Television. As technical director for all shuttle landings at Edwards, she is responsible for coordinating all TV coverage and has won numerous awards for her work with the shuttle program as well as on other Dryden research projects. Honors she has received include three Videographer of the Year awards.

Jones is a Range Control Officer and WATR Range shuttle program manager. He provides Dryden range mission scheduling and real-time support for telemetry and radar tracking systems, ground-

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Safety Day scheduled for May 25

Dryden's semiannual Safety Day will be held May 25 in hangar 4802. "Flight Safety" is the event theme.

Activities begin at 8 a.m. with opening remarks by Deputy Center Director Pat Stoliker and Glenn Bever, Code R chief. Topics for the morning sessions will be "Space Systems Development-Lessons Learned," led by Joe Nieberding; "Building the Chain: A Mishap Simulation," by Steve Jensen, Ryan Dibley and others; and "Forged in the Stars," with Jay O'Callahan.

After a lunch break from 11:40 a.m. to 12:40 p.m., afternoon sessions will include "Emergency Timeline," with Los Angeles Fire Department fire chief and paramedic Tom Stafford; a presentation on the X-48B engine test stand, by Jonathan Vass; and "Hangar and Flight Line Safety," with Nick Kiriokos. A short wrap-up by Stoliker will conclude the day at about 2 p.m.

DC-8 completes mission

By Emily Schaller
National Suborbital Education and Research Center
NASA Airborne Science Program

How do instruments end up on satellites orbiting Earth?

Long before they are ever launched into space, many of them are tested aboard NASA airplanes. Among the objectives of the NASA Airborne Science program is testing new instruments in space-like environments. Testing future satellite instruments on airplanes is the next best thing to testing them in space.

During the past three weeks, a team from Goddard Space Flight Center, Greenbelt, Md., led by Bill Heaps has been testing a new broadband lidar instrument on NASA's DC-8 flying laboratory that the team hopes will be flown on the ASCENDS satellite mission. ASCENDS is an acronym for Active Sensing of Carbon dioxide Emissions over Nights, Days and Seasons and is the moniker chosen for a NASA satellite that is expected to be launched between 2018 and 2020. The goal of the ASCENDS mission is precise measurement of the sources and distribution of and variations in carbon dioxide gas all over the Earth. Mapping carbon dioxide contributes to understanding of the global carbon cycle and is used to model global climate change.

How is carbon dioxide measured from space?

Carbon dioxide makes up a very small fraction of the gas in Earth's atmosphere. The majority of carbon dioxide variability occurs in the first 100 feet above the Earth's surface. Measuring the abundance of carbon dioxide with a satellite means that instruments used must "look" through Earth's atmosphere in order to detect variations in carbon dioxide occurring near the planet's surface.

Heaps' broadband lidar (a shorthand phrase for "light detection and ranging") uses an infrared laser beam aimed at Earth's surface. As the laser passes through the atmosphere and bounces off the ground, carbon dioxide molecules in the atmosphere absorb light generated by the laser. Measuring the amount of absorption that occurs as the instrument passes over different locations on Earth will allow the team to build global carbon dioxide maps.

Typical lidar systems have lasers that emit light at specific colors, or wavelengths. Carbon dioxide molecules, however, absorb light at different infrared wavelengths. The broadband laser in Heaps' instrument emits light with a

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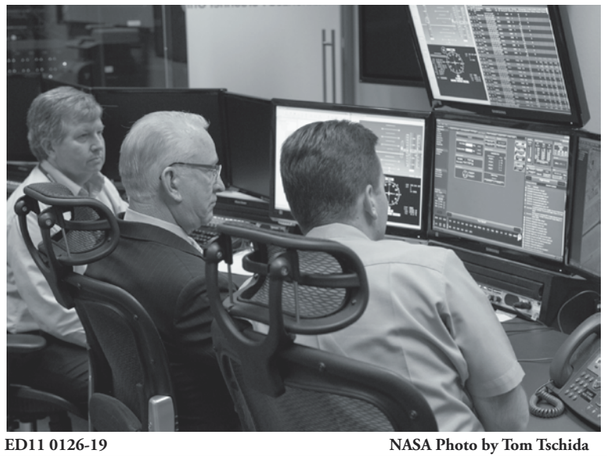


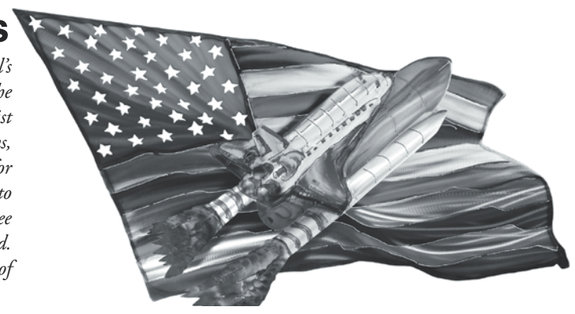
Front seat

Congressman Howard P. "Buck" McKeon, center, reviews flight deck displays in the Global Hawk operations center with project manager Chris Naftel, left, and deputy project manager Phil Hall. McKeon (R-25), chairman of the U.S. House Armed Services Committee, was updated on Dryden's recent work during an April 26 visit. McKeon is founder of the Congressional UAV Caucus, which promotes the strategic, tactical and scientific value of unmanned aircraft.

ED11 0126-19 **NASA Photo by Tom Tschida**

Honoring 30 years

Denise Harris captured the Exchange Council's monthly photo contest celebrating 30 years of the space shuttles with a picture of Tehachapi artist Darrell William's metal artwork. Williams, who is Harris' father, completed the artwork for his daughter after he was inspired by a visit to Dryden, where he had the opportunity to see an orbiter. "He was awestruck," Harris said. The image for use in the X-Press is courtesy of Dryden photographer Carla Thomas.



News at NASA

OCT chooses payloads

NASA has selected 16 payloads for flights on the commercial Zero-G parabolic aircraft and two suborbital reusable launch vehicles as part of the agency's Flight Opportunities Program, under the direction of the Office of the Chief Technologist. The flights provide opportunities for space technologies to be demonstrated and validated in relevant environments. In addition, the flights foster development of the nation's commercial reusable suborbital transportation industry.

The payloads and teams from ten states and the District of Columbia were selected from applications received in response to a NASA call issued in December. Of the payloads, 12 will ride on parabolic aircraft flights, two on suborbital reusable launch vehicle test flights and two on both platforms.

The commercial Zero-G aircraft payloads will fly during a weeklong campaign from Houston's Ellington Field in mid-July. The suborbital reusable launch vehicle payloads will fly on the Xaero, developed by Masten Space Systems of Mojave, Calif., and the Super Mod, developed by Armadillo Aerospace of Heath, Texas. The payloads will be flown on test flights scheduled throughout 2011.

Proposals will be accepted until Dec. 31, 2014. The program is managed at Dryden. Payload activities for the program are managed at Ames Research Center, Moffett Field, Calif. For a complete list of the 16 proposals chosen and more information on the Flight Opportunities program, visit http://flightopportunities.nasa.gov.

Officials: Groundwater cleanup is on track

The effort to clean up contaminated groundwater lying beneath Dryden property was recently confirmed to be on track after a review by environmental officials.

The cleanup is being conducted under the Comprehensive Environmental Response, Compensation, and Liability Act, commonly called Superfund. It has been under way since 2006, when the center director and state and federal environmental agencies signed a formal Record of Decision confirming that the cleanup would be undertaken.

The groundwater contamination is the result of past spills and leaks and consists primarily of the solvent TCE and several constituents of gasoline. After several years of study, the cleanup method chosen was injection of oxidants into the groundwater, which remove the contaminants in place. In addition, the groundwater is periodically sampled and tested in a laboratory to determine the effectiveness of the cleanup and to ensure the safety of center employees.

A review of the past five years of the effort began in November 2010 and is nearing completion. The review team checked records to determine the effectiveness of the cleanup technology and conducted a site inspection and will soon be conducting interviews of site personnel.

When the five-year review is complete, inspectors will generate a report detailing information that includes background on the site and cleanup activities, a description of the review process and explanation of review results. The team also will write a summary and announce that the review is complete. The Dryden community will be advised via public notice where to find copies of the report and summary.

Written comments will not be solicited by the center environmental office but interviews of selected Dryden personnel will be conducted in the near future. Contact Dan Morgan, environmental officer, at ext. 3976 for further information.

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air communications, optical trackers and mission control centers involved with shuttle landings at Edwards. He also trains personnel for work in range activity and shuttle mission support.

Webb, a technician with more than 21 years' experience in shuttle operations, supports radar and data processing systems operations and maintenance at the Aeronautical Tracking Facility, for shuttle missions as well as aeronautical research projects. He has supported more than 100 shuttle missions.

Pavlicek is a Range Control Officer who has supported the shuttle program for 25 years. He provides support to all range activities, including WATR support for all shuttle, ISS and Soyuz missions, and coordinates training, mission planning and real-time mission support.

Phantom Ray... from page 1

Phantom Ray program manager. "Autonomous, fighter-sized unmanned aircraft are real, and the UAS bar has been raised. Now, I'm eager to see how high that bar will go."

The Phantom Ray program is one of several in Boeing's Phantom Works – including the Phantom Eye – and is part of a rapid prototyping initiative to design, develop and build advanced aircraft and demonstrate their capabilities. Dryden also is hosting the Phantom Eye developmental test flights.

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broader range of wavelengths, enabling it to detect carbon dioxide absorption in multiple wavelength bands with one laser. The wavelength control requirements are also less strict than those of a more conventional narrowband laser, potentially making the system easier to implement on a satellite.

The Goddard team worked for more than two weeks at the Dryden Aircraft Operations Facility in Palmdale, Calif., to install and test the instrument on the DC-8.

During the week of May 2-6, the team flew with the instrument on two four-hour flights over northern and central California. They tested the instrument's performance at a variety of altitudes and over different types of surfaces – deserts, agricultural fields, mountainous terrain, the ocean and the calmer waters of Lake Tahoe. The team was pleased with the lidar's performance.

"The system definitely measured CO_2 on both flights, even transmitting a very small amount of laser power. I believe the broadband technique has excellent potential to be scaled up for measurements from space," Heaps said.

In July, several instrument teams, all vying to have their instrument flown on the ASCENDS mission, will test their instruments side by side on the DC-8. With data from the May test flights of the broadband lidar instrument in hand, Heaps' team will now return to Goddard to make refinements to the instrument in the hope that it will be chosen for the mission.

Funding for the Goddard broadband lidar was provided by the NASA Earth Science Technology Office Instrument Incubator program.

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